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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/710,452	07/13/2004	Jeng-Wei Yang	NAUP0470USA1	4451
27765	7590	07/22/2005	EXAMINER	
NORTH AMERICA INTERNATIONAL PATENT OFFICE (NAIPC)			TRAN, BINH X	
P.O. BOX 506			ART UNIT	
MERRIFIELD, VA 22116			PAPER NUMBER	

1765

DATE MAILED: 07/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>		<b>Applicant(s)</b>	
	10/710,452		YANG ET AL.	
	<b>Examiner</b>		<b>Art Unit</b>	
	Binh X. Tran		1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 13 July 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>8/23/04</u>   | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Claim Objections***

1. Claim 2 is objected to because of the following informalities: In claim 2, the phrase "selected from a group consisting of" is improper Markush language. The examiner suggests replacing "selected from a group consisting of" with --selected from the group consisting of--. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-4, 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andreas et al. (US 6,589,882) in view of Bergman (US 6,240,933).

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Respect to claim 1, Andreas discloses a method for washing a silicon wafer comprising a backside surface and bevel edges (fig 1), the method comprising:

applying a cleaning composition to the silicon wafer surface for a process time,

the cleaning composition comprising:

- a first acid (acetic acid aka  $\text{CH}_3\text{COOH}$ ) for removing copper from the silicon wafer,
- an oxidizing agent ( $\text{HNO}_3$ ) for oxidizing the silicon wafer;
- a second acid (HF) (See col. 2);
- water.

Andreas fails to explicitly disclose deionized (DI) water in the cleaning composition or the step of spin-drying the silicon wafer. In a semiconductor process, Bergman teaches to use DI water (col. 5 lines 50-53). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Andreas in view of Bergman by using DI water because it will reduce ionized contamination in the cleaning solution.

Bergman also teaches the step of spin dry the wafer (col. 8 lines 40-44). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Andreas in view of Bergman by spin-drying the silicon wafer because it helps to remove the liquid from the surfaces and minimizes drying time.

Respect to claim 2, Andreas discloses the first acid is acetic acid ( $\text{CH}_3\text{COOH}$ ) or  $\text{HNO}_3$ . Respect to claim 3, Andreas discloses the oxidizing agent is  $\text{HNO}_3$ . Respect to claim 4, Andreas discloses the second acid is HF.

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Respect to claim 7, Bergman discloses the process time is 30 second (col. 7 lines 12-15). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Andreas in view of Bergman by perform for 30 second because it will effective clean the wafer surface.

5. Claims 5-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andreas in view of Bergman as applied to claim 1 above, and further in view of Katakabe et al. (US 6,558,478) .

Respect to claims 5, Andreas teaches the first acid (acetic acid) is presented in an amount between 3-20% by weight and the second acid (HF) is presented in 0.05-3% by weight (col. 2 lines 39-45, within applicants' range of 10-15% for the first acid, and 0.5-1% for the second acid). Andreas differs from claim 5 by the specific amount of oxidizing agent. Katakabe teaches the amount of oxidizing agent is a result effective variable ranging 10-80% (within applicants' range, col. 5 lines 30-47). The result effective variable is commonly determined by routine experiment. The process of conducting routine experiments so as to produce an expected result is obvious to one of ordinary skill in the art. Hence, it would have been obvious to one having ordinary skill in the art, at the time of invention, to perform routine experiment to obtain an optimal amount of oxidizing agent as an expected result.

Respect to claim 6, Andreas teaches the barrier layer comprise TiN or TaN (col. 4 lines 15-20). Katakabe also teaches the barrier layer made of TaN is exposed after etching (col. 8 lines 48-53). Since the barrier TaN layer is exposed, the examiner can interpret that the barrier residues comprise TaN.

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***Conclusion***

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Binh X. Tran whose telephone number is (571) 272-1469. The examiner can normally be reached on Monday-Thursday and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on (571) 272-1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*Binh Tran*

Binh X. Tran